Revisiting Poinsettia
Cold Finishing Up North

Figure 1. Examples of quality ratings: A) Quality rating = 10; B) Quality rating = 18; C) Quality rating = 26.

Cold finishing makes sense for certain poinsettia cultivars. Find out which ones cold finish best, best practice strategies and how much money you can save.

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AS growers, we continue to look for methods to reduce costs while still producing high-quality crops. This is especially true when growing poinsettias, as margins continue to grow thin and competition gets stronger. Growing poinsettias at cool temperatures has emerged as an option over the past several years to reduce heating costs.

The University of New Hampshire and Purdue University have been conducting research on a method we call cold finishing. Instead of turning down the thermostat for the entire production cycle of the crop, the temperatures are lowered during the latter portion of the cycle only, when the bulk of the heating costs are incurred. This also allows you to take advantage of the naturally warm temperatures in

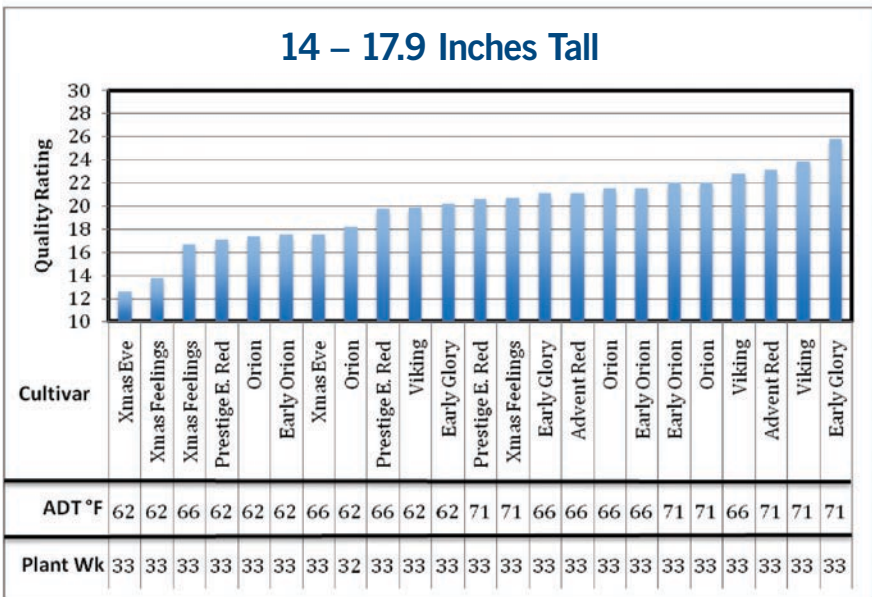

Figure 2. Quality ratings for plants with a finish height of 14 to 17.9 inches with cultivar, average daily temperature and plant week.

August, September and early October to bulk up plants before initiating short days.

How Cold Finishing Works

In the trials we've conducted, plants were grown according to a traditional crop schedule from potting until October 15. At this time, plants were moved to greenhouse zones with three different average daily temperatures (ADT). For more information on our growing protocols, visit **GreenhouseGrower.com** to read our July 2009 Greenhouse Grower article "Cold Finishing Up North."

96 × 34 Foot Double Poly Hoop House				
ADT °F	Concord, N.H.		Indianapolis, Ind.	
	Total Cost	Cost/ft^2	Total Cost	Cost/ft^2
71	$5,260	$1.61	$3,812	$1.17
66	$4,620	$1.42	$3,222	$0.99
62	$4,087	$1.25	$2,731	$0.84

Table 1. Heating cost for a 3,264-square-foot, double-poly hoop house in Concord, N.H. (using No. 2 heating oil at $2.10 per gallon) and in Indianapolis, Ind. (using propane at $1.35 per gallon), from August 1 to December 15 with cool finishing ADT starting on October 15.

If you are not familiar with the term ADT, it is the average temperature plants are exposed to over a 24-hour period. For example, for 12 hours (7 a.m. to 7 p.m.) the greenhouse temperature is 75°F during the day and for 12 hours (7 p.m. to 7 a.m.) the temperature is 67°F, resulting in an ADT of 71°F. Why wait until October 15 to lower the temperatures?

In New Hampshire and Indiana, it is reasonable to obtain these temperatures after mid-October. Before this, it is difficult to maintain this low of a daytime temperature. The lower ADT is maintained throughout the remainder of the cropping time.

How Money Can Be Saved

Cost, of course, is one of the most important factors when evaluating if cold finishing will work for you. To estimate the difference in heating costs when cold finishing at three different temperatures, we used Virtual Grower (free software developed by the USDA). Table 1 shows the difference in heating costs when growing poinsettias in a 96- by 34-foot double-poly hoop house in either Concord, N.H., or Indianapolis, Ind. For the Indianapolis example, the grower would save $1,081 (28 percent), finishing at an ADT of 62°F starting on October 15 – rather than an ADT of 71°F.

Table 2 (page 34) summarizes the savings for a crop grown in a 100- by 440-foot (roughly an acre) gutter-connected glasshouse in the same locations. In this case, a grower in Concord would save $19,280 (21 percent) using an ADT of 62°F versus 71°F. You can estimate the cost savings for your own operation by downloading Virtual Grower at **http://www.ars.usda.gov/Research/docs.htm?docid=19961**. Virtual Grower is also available in Spanish at the same website.

Which Cultivars To Grow

Which cultivars to grow is a complicated question. Let's first take a look at the research done at The University of New Hampshire and Purdue University. In 2009, 'Advent Red,' 'Christmas Eve,' 'Christmas Feelings,' 'Early Glory,' 'Early Orion,' 'Early Prestige,' 'Orion' and 'Viking' were evaluated at three different finishing ADT over three different planting dates. Rooted cuttings were received and planted into 6.5-inch pots on week 31 (July 27), week 32 (Aug 3) and week 33 (Aug 10).

Once planted, they were grown at day/night temperatures (12 h/12 h) of 75/67°F (ADT or 71°F) and a 16-hour photoperiod provided by high-pressure sodium lamps, until the start of short days on October 1.

On October 15, plants were moved to zones with day/night temperatures (12 hr/12 hr) of 75/67°F (ADT 71°F), 70/62°F (ADT 66°F) or 68/56°F (62°F). These temperatures were determined based on the results from the previous year's studies, indicating they would produce a high-quality crop. The plants were evaluated weekly for height, for first color and at finish for bract area, anthesis (first pollen shed) and marketability date.

At the end of the study, plants were given a rating based on overall quality and appearance. This rating was determined by calculating the ratio of bract area to plant height. Using this type of a rating system, a plant that had a high bract area for its height would obtain a high rating, while a tall plant with a small bract area would receive a low rating (Figure 1).

Cultivar is not the only factor to consider when using the cold finishing production method. You must also consider the planting week (which influences plant development before October 15) and the ADT (which influences plant development after October 15).

We have developed a series of charts to help you determine how to factor in all three of these variables to make a decision. These charts segregate our ratings by the finish heights of the cultivars trialed. Figure 2 (page 30) illustrates the combinations of planting week, cultivar and ADT that resulted in finished plants between 14 and 17.9 inches tall (from the bench to the top of the plant).

For the combinations resulting in finished plants between 18 and 19.9 inches and 20 and 25 inches go online to

GreenhouseGrower.com. To use these charts, first determine the target height for your finished plants. For an example, we'll use a target height of 16 inches with a tolerance of + 2 inches and use the chart for plants finishing between 14 and 17.9 inches (Figure 2). Next, to determine the quality rating that you wish to obtain at our cold finishing temperatures (ADT of 62 or 66°F),

100 × 440 Gutter-Connected Glasshouse				
ADT °F	Concord, N.H.		Indianapolis, Ind.	
	Total Cost	Cost/ft2	Total Cost	Cost/ft2
71	$89,055	$2.02	$65,480	$1.49
66	$78,419	$1.78	$55,383	$1.26
62	$69,775	$1.59	$47,286	$1.07

Table 2. Heating cost for a 100- by 440-foot (about 1 acre) gutter-connected glasshouse in Concord, N.H. (using No. 2 heating oil at $2.10 per gallon) and in Indianapolis, Ind., (using propane at $1.35 per gallon) from August 1 to December 15 with cool finishing ATD starting on October 15.

we'll use between 20 and 24. That will result in the following options: 'Viking' or 'Early Glory' planted on week 33 and finished at 62°F ADT, or 'Advent Red,' Early Orion,' 'Orion,' 'Viking' or 'Early Glory' planted on week 33 and finished at 66°F.

Note that the quality rating used here is biased toward shorter plants with relatively large bract areas. Each grower should determine what quality rating they want to target on this particular scale: this may be dependent on clientele.

Remember that the finished height of your crop is dependent on factors in addition to cultivar, greenhouse temperature and plant week. Growers may obtain different results depending on PGR use, as well as outdoor temperatures and light levels in a given year. Note that no plant growth regulators were used in this study. It is recommended that growers use these charts as a starting point but conduct their own trials to determine what combinations result in the desired finished plant. **GG**

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